

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



PATENT  
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

BYRNE

Serial No.: 10/686,632

Group Art Unit: 1772

Filed: October 17, 2003

For: TRENCH COVER

CLAIM TO PRIORITY

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The benefit of the filing date of the prior foreign application filed in the following foreign country(ies) is hereby requested and the right of priority provided in 35 U.S.C. §119 is hereby claimed:

Ireland Application No. S2001/0375 filed 17 April 2001; and

In support of this claim, filed herewith is a certified copy of said foreign application.

Respectfully submitted,

JACOBSON HOLMAN PLLC

By: \_\_\_\_\_

  
John C. Holman  
Reg. No. 22,769

400 Seventh Street, N.W.  
Washington, D.C. 20004-2201  
Telephone: (202) 638-6666

Atty. Docket No.: P69223US0  
Date: February 3, 2004  
JCH:crj



Patents Office  
Government Buildings  
Hebron Road  
Kilkenny

I HEREBY CERTIFY that annexed hereto is a true copy of documents filed in connection with the following patent application:

Application No. S2001/0375

Date of Filing 17 April 2001

Applicant DAVID VINCENT BYRNE, an Irish Citizen of 21 Glasilawn Road, Glasnevin, Dublin 11, Ireland.

Dated this 2 day of September 2003.



An officer authorised by the  
Controller of Patents, Designs and Trademarks.

## REQUEST FOR THE GRANT OF A PATENT

PATENTS ACT, 1992

The Applicant(s) named herein hereby request(s)  
\_\_\_\_\_ the grant of a patent under Part II of the Act

  X   the grant of a short-term patent under Part III of the Act  
on the basis of the information furnished hereunder.

1. Applicant(s)

Name            DAVID VINCENT BYRNE

Address        21 Glasilawn Road  
                  Glasnevin  
                  Dublin 11  
                  Ireland

Description/Nationality

An Irish Citizen

2. Title of Invention

"A Cover "

3. Declaration of Priority on basis of previously filed application(s) for same invention (Sections 25 & 26)

Previous filing date

Country in or for  
which filed

Filing No.

4. Identification of Inventor(s)

Name(s) of person(s) believed  
by Applicants(s) to be the inventor(s)

Name:            David Vincent Byrne, An Irish Citizen

Address:        21 Glasilawn Road, Glasnevin, Dublin 11, Ireland

5. Statement of right to be granted a patent (Section 17(2) (b))

6. Items accompanying this Request – tick as appropriate

- (i) ☒ prescribed filing fee (£50.00)  
(ii) ☐ specification containing a description and claims  
☒ specification containing a description only  
☒ Drawings referred to in description or claims  
(iii) ☐ An abstract  
(iv) ☐ Copy of previous application (s) whose priority is claimed  
(v) ☐ Translation of previous application whose priority is claimed  
(vi) ☒ Authorisation of Agent (this may be given at 8 below if this Request is signed by the Applicant (s))

7. Divisional Application (s)

The following information is applicable to the present application which is made under Section 24 –

Earlier Application No: .....

Filing Date: .....

8. Agent

The following is authorised to act as agent in all proceedings connected with the obtaining of a patent to which this request relates and in relation to any patent granted -

Name

John A. O'Brien & Associates

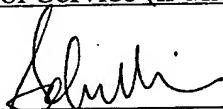
Address

The address recorded for the time being in the Register of Patent Agents, and currently Third Floor, Duncairn House, 14 Carysfort Avenue, Blackrock, Co. Dublin, Ireland.

9. Address for Service (if different from that at 8)

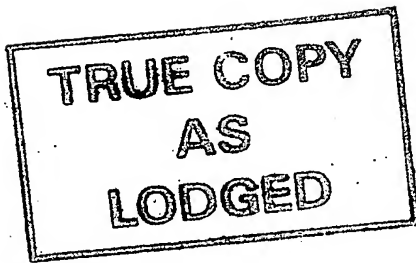
As above

Signed



JOHN A. O'BRIEN & ASSOCIATES

Date April 17, 2001



SO 10375  
APPLICATION No. \_\_\_\_\_  
BYND04/P

- 1 -

"A COVER"

Introduction

5 The invention relates to a trench cover for temporarily covering a trench made in a footpath or roadway.

10 Digging trenches for laying cables, pipes and the like is extremely labour intensive. There are severe constraints on efficient digging because of the need to complete the digging, fitting and filling operation as quickly as possible. This is especially difficult in situations where the path or roadway must be kept open. Thus, a considerable amount of work is required to backfill trenches while the trench digging work is ongoing. Regularly, a large proportion of the available working day is involved in temporary backfilling and the renewal of the  
15 backfilling to allow the work to continue. This is a major cost factor as not only is their a high labour content but also backfill is generally a waste product that cannot be used as permanent trench filling.

20 Various attempts have been made to provide a trench cover to temporarily cover a trench. Such trench covers however have a number of disadvantages and are consequently used infrequently, backfilling being the preferred option.

25 US-A-4,801,483 describes a ground opening cover with anchoring holes for anchoring the cover in place. It is not practical to temporarily cover a trench with such plates as each plate must be anchored separately and each of these anchors must be released to remove the cover.

30 GB-A-2305954 describes a temporary trench cover comprising an upper plate with depending walls for inserting into the trench. An angle piece is secured to one depending wall to provide a connection means in the form of a channel having an

upwardly opening mouth into which an opposite depending wall of an adjacent plate is engaged. While such an arrangement prevents longitudinal movement between adjacent cover plates the plates are easily removed by pulling the plates upwardly using the finger receiving apertures. Thus, the plates are not secured  
5 against unauthorised removal. In addition, the arrangement does not facilitate covering of a trench which is not straight.

EP-A-0431777 describes a cover for temporarily covering a trench which is releasably engagable with an adjacent cover. The cover is a tight fit in a trench  
10 and the arrangement does not facilitate relative movement between adjacent cover elements. Further, unauthorised removal is not prevented as the covers can be relatively easily removed by moving a cover out of the general plan of the assembly.

15 GB-A-2 321 486 describes a temporary trench cover comprising a hollow shell of plastics material with a downwardly protruding portion to define lateral abutment faces which are spaced apart by a width corresponding to the width of the trench so as to engage the side walls of the trench. The cover may have a part-circular tongue at one end for engaging in a corresponding part-circular recess defined by  
20 an open-ended socket of an adjacent element to allow adjacent cover elements to be articulated. Such an arrangement is difficult to manufacture and, the covers can be relatively easily removed by unauthorised personnel by moving a cover out of the general plan of the assembly. In addition, while the arrangement illustrates relative movement between adjacent covers the gaps between adjacent covers  
25 presents a hazard as, for example, a bicycle wheel may become wedged in the gap with attendant safety problems.

In my WO 01/21898 A I have described a temporary trench cover plate which addresses the problems with known cover plates. The entire contents of this  
30 specification are incorporated herein by reference.

In some cases it is desirable to provide a temporary trench cover plate which can be used with a relatively wide range of trench widths. This invention is directed towards providing such a trench cover plate.

5

### Statements of Invention

10

15

20

According to the invention there is provided temporary trench cover element comprising a cover member for extending over a trench, the cover member comprising a pair of ground engaging portions bridged by a central trench covering portion, the ground engaging portions defining a pair of opposite sides for location outside of a trench and the cover member having a pair of transverse ends extending transversely between the opposite sides, confinement means extending downwardly from the central portion of the cover member to confine the cover with respect to a trench opening, the confinement means being width adjustable. In one embodiment of the invention the confinement means is movable to adjust to a desired width. In a preferred embodiment the confinement means comprises at least two trench engaging elements, at least one of the trench engaging elements being adjustable to accommodate the width of a trench. Preferably there are two oppositely directed trench engaging elements. The or each trench engaging element is preferably adjustable between a range of discrete locations.

25

In one embodiment the or each trench engaging element is slidably adjustable.

Locking means are preferably provided to lock the or each trench engaging element in a desired position. The locking means may be releasable on site and/or off site.



In one embodiment the cover element comprises interlink means comprising a first interlink means at one transverse end and a complementary second interlink means at an opposite transverse end, one of the first or second interlink means being engagable underneath the other of the first and second interlink means of a like cover element on assembly, a cover element being relatively movable with respect to an adjacent cover element to follow the contour of a trench.

In a preferred embodiment of the invention one of the interlink means is oversize with respect to the other of the interlink means to allow limited relative movement between the interlink means so that the cover elements follow the contour of the ground.

Preferably wherein the interlink means of adjacent cover elements are relatively moveable in a vertical direction and/or a horizontal direction to follow the vertical contour of the trench.

In one embodiment of the invention the first interlink means comprises a head part projecting from a transverse end of a cover member and the second interlink means comprises a slot adjacent a transverse end of a cover member to receive the head part of a first interlink means of an adjacent like cover element on assembly.

Preferably, in one embodiment the second interlink means comprises a slot defined in an underside of the cover member. In a preferred embodiment the slot is a downwardly opening slot and the head part engages in the slot from below. Ideally the slot is oversize with respect to the head part to allow limited relative movement between the head part and the slot so that a cover element may be moved relative to an adjacent cover element to follow the contour of a trench. In one arrangement the slot is defined in an underside of the central portion of the cover member.

In a particularly preferred embodiment of the invention the interlink means includes at least one wing which extends from a transverse end of the cover member. Most preferably the at least one wing extends for a distance to bridge at least portion of a gap between adjacent cover elements, on assembly.

5

Ideally the cover member has a wing receiving recess to receive portion of the end wing of an adjacent cover element, on assembly.

10

The end wing is preferably located to one side of one or both of the interlink means. Preferably there are two transversely spaced-apart end wings. In one embodiment the first interlink means is a slot at a first transverse end of the cover and the or each wing extends from the first transverse end.

15

Most preferably the or each end wing extends from one cover element underneath an adjacent cover element, on assembly.

20

In a particularly preferred embodiment at least one transverse end is shaped to facilitate limited relative movement between end marginal edges of adjacent cover elements. Ideally at least one end marginal edge is at least partially of curvilinear shape, preferably of arcuate shape, ideally of generally convex shape.

25

In another embodiment of the invention the first interlink means comprises a male part projecting from one transverse end and the second interlink means comprises a slot adjacent the opposite transverse end for receiving the head part of an adjacent like cover element, on assembly, the head part and slot being shaped to facilitate assembly of the head part into the slot in a first orientation of the cover element and to prevent removal of the head part from the slot in another, assembled orientation.

5 In this case preferably the male part has a projecting head section and a neck section of reduced width with respect to the head section. Ideally the slot has a top entry opening to permit entry of the head section in the first orientation and to prevent exit of the head part in the assembled orientation. Preferably the slot includes a side assembly opening through which the neck section of the male part extends in the assembled orientation.

10 In one embodiment of the invention the cover element includes handle lifting means.

Ideally the cover member has an anti-slip surface.

15 In one embodiment the cover element includes tracking code means. Preferably the code means is housed within the cover member.

In another embodiment the cover element includes anchoring means for anchoring the cover member. The anchoring means may include an anchor formation such as a slot or hole in or on the cover member. The anchor formation may be a slot for receiving an anchoring clip.

20 The invention also provides a cover assembly comprising a number of cover elements as of the invention.

#### Brief Description of the Drawings

25 The invention will be more clearly understood from the following description thereof given by way of example only with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view showing the top of a trench cover plate according to the invention;

Fig. 2 is a perspective view showing the underneath of the cover element;

5

Fig. 3 is an underneath plan view of the cover element;

Fig. 4 is a cross sectional view of a detail of the cover element.

10

Fig. 5 is a cross sectional view showing the assembly of a number of the cover elements;

Fig. 6 is a perspective view of a number of trench cover elements in position covering a trench;

15

Fig. 7 is a cross sectional view of one trench cover element in position in a trench; and

20

Fig. 8 is a plan view of a number of trench cover elements covering a trench with a curved contour.

#### Detailed Description

25

Referring to the drawings there is illustrated in a temporary trench plate cover element 1. Each cover element 1 covers part of a trench 4 in the ground 3 and a number of the cover elements 1 are interlinked to follow the contour of the ground 3 in which the trench is dug. In Fig. 6 the cover elements 1 are shown following a relatively straight course while in Fig. 8 the elements 1 are shown following a curvilinear course.

30

In this case the cover element 1 comprises a cover member for extending over a trench 4, especially in a roadway. The cover member comprises a pair of side ground engaging portions 10, 11 bridged by a central trench covering portion 12. The cover member is of generally convex shape in transverse cross section, the side portions 10, 11 reducing in cross section towards opposite side marginal edges 14, 15 of the cover member to define a slight ramp to facilitate vehicle wheels passing thereover. The exposed upper surface of the cover member has anti-slip formations which in this case are defined by generally square shaped raised portions 16. Anchor holes 19 are provided in the side portions 10, 11 to facilitate anchoring to the ground 3, if desired. A central recessed area 20 is provided for attachment of a reflector strip or the like. To facilitate erection of a post for a warning flag, sign or the like the cover member has a mounting hole 21. Another recess 22 is provided to receive a coding means such as an identity tag or transponder unit to uniquely identify the cover element 1 for tracing and the like.

The cover member has a pair of transverse ends 25, 26 extending transversely between opposite sides 14, 16. Confinement means in the form of trench engaging elements 27, 28 confine the cover with respect to the opening of the trench 4. Referring in particular to Figs. 2 to 4 it will be noted that the two trench confinement elements 27, 28 are oppositely directed so that, in use, they engage opposite side walls of a trench. Each confinement element comprises an arm 100, 101 with an elongate slot 102, 103 for slidable adjustment relative to a locking bolt 104, 105. The slots 102, 103 in this case have a number of discrete enlarged areas 110 which are sized to lockingly receive a locking usher 111. To adjust the distance between the trench engaging faces of the elements 27, 28 to correspond with the width of a trench to be covered one or both locking bolts 104, 105 are released, the arms 100, 101 slidably adjusted and the locking bolts are then re-locked.

The trench engaging elements 27, 28 are adjustable to accommodate a range of trench widths, typically from 300 to 500 mm. The elements 27, 28 are preferably incrementally adjustable in increments of typically 25 mm.

5 Interlink means comprises a first male interlink means 30 and a second female interlink means 31, and the interlink means 30, 31 of adjacent like cover elements are interengaged on assembly of the cover elements 1. In this case the male interlink means comprises a head part 35 projecting from the transverse end 26 of the cover member. The head part 36 has an area of reduced cross section defining  
10 a neck 36 and is located centrally of the transverse end 26.

The female interlink means comprises a downwardly opening slot 40 at the transverse end 25. The slot 40 is defined in the underside of the cover member by downwardly extending walls 41 and portion of the transverse wall 29. The width  
15  $d_1$  of the slot 40 is oversize with respect to the width  $d_2$  of the head part 35 of the male interlink to permit limited relative movement between adjacent cover elements on assembly so that the cover elements 1 can follow the contour of the ground. Similarly, the length of the head part 35 is less than the length of the recess 40. It will be noted that the upper ends of the head part 35 are tapered to  
20 facilitate assembly of the head part 35 into the recess 40.

The interlink means in this case also comprises a pair of end wings 50, 51 which extend from the transverse end 25. The end wings 50, 51 are located on either side of the recess 40 and extend generally from the ground engaging portions 10,  
25 11 of the cover member. On assembly, the end wings 50, 51 are received underneath an adjacent cover element. In this case the end wings 50, 51 are received in recessed areas 52, 53 respectively flanking the head part 35.

The end wings 50, 51 engaging underneath an adjacent cover element, in  
30 combination with the inter-engagement of the head part 35 in the slot 40 secures

adjacent cover elements together in such a way as to facilitate relative movement between adjacent cover elements to follow the contour of the trench.

5 On assembly, end cover elements are anchored to the ground and because of the inter-engagement on both transverse ends none of the cover elements in the assembly can be removed by an unauthorised person. This prevents theft and also enhances the safety aspects of the assembly. In addition, the end wings 50, 51 have the important advantage that they at least partially occlude any gap between adjacent cover elements on assembly. This is also an important safety feature as  
10 there is no gap on which to snag a bicycle wheel or the like.

At least one transverse end, in this case the end 25 is shaped to facilitate limited relative movement between end edges 25, 26 of adjacent cover elements 1. In this case the transverse end is of generally convex curvilinear shape.

15 The cover elements are readily assembled as described above to form a rigid temporary trench cover that can be easily disassembled. Most importantly, controlled relative movement is allowed so that the cover follows the contour of the ground, preferably in both the vertical and horizontal planes. This ensures a particularly safe and even temporary surface over a trench opening.  
20

The cover elements may include a code tracking means such as a transponder which may be housed within the cover to allow the location of the cover elements to be determined from a remote location. In this way the hire and use of the  
25 elements can be controlled.

The invention provides a simple yet extremely effective temporary cover for a range of trench widths. Adjacent covers are readily interconnected as described above. The fittings allow the cover to readily follow both the contour of the

ground in which the trench is dug and also the path of the trench. Handles may also be provided for ease of handling of the cover.

5 The trench cover may be anchored into position. Usually, the cover will be anchored at either end by, for example, an anchor bolt which may subsequently be temporarily covered. The may also be anchored to the trench at any suitable point, for example at 5 m length. The anchoring may be achieved by a releasable hook linkage between the cover and a trench strut.

10 The trench cover assembly of the invention is easily handled and can therefore be used as a substitute for backfilling. Thus, the labour force can be concentrated on the trench digging operation, which is thereby optimised.

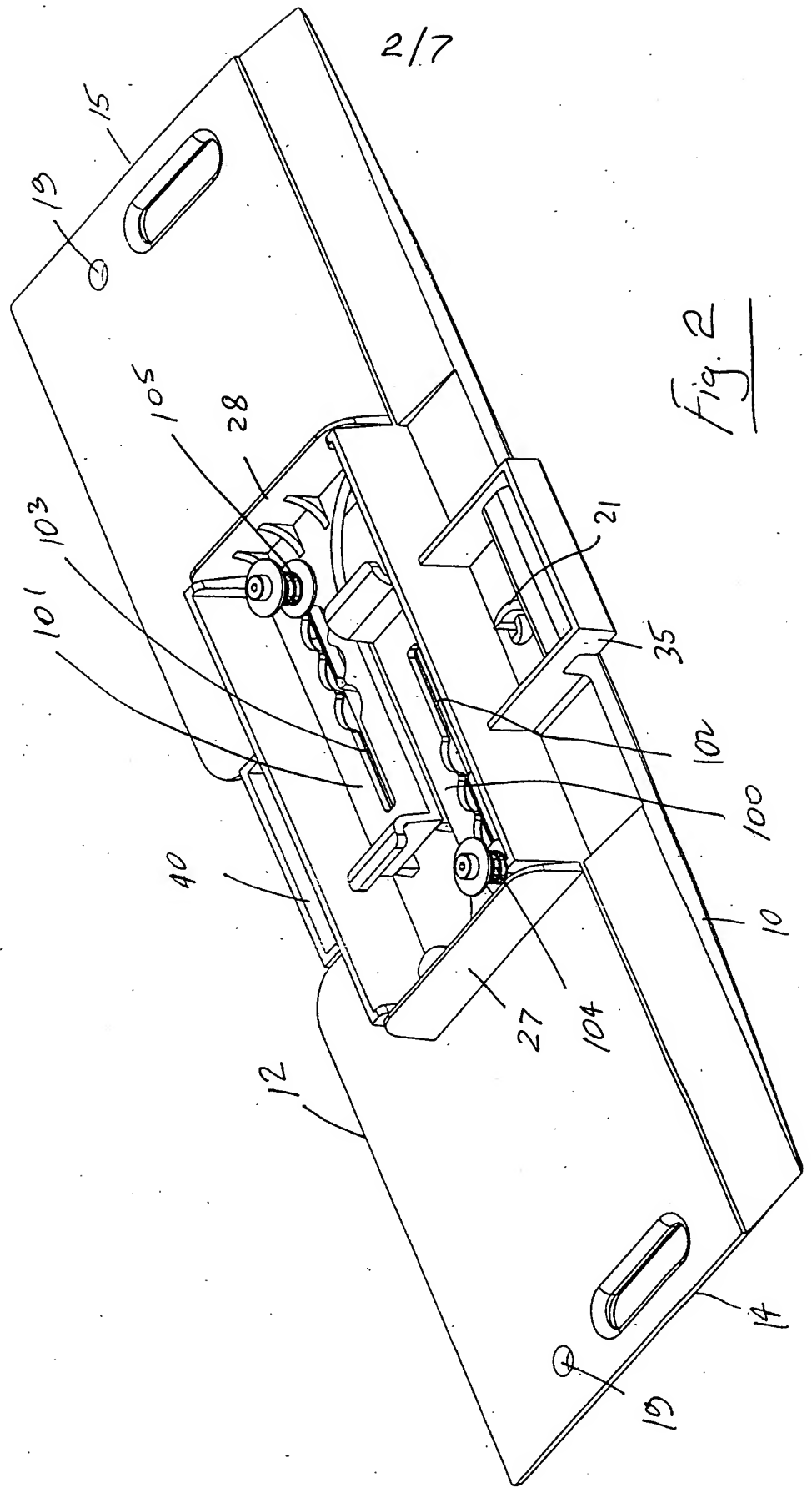
15 Many variations on the specific embodiments of the invention will be readily apparent and according to the invention is not limited to the embodiments hereinbefore described which may be varied in construction and detail.





2/7

Fig. 2



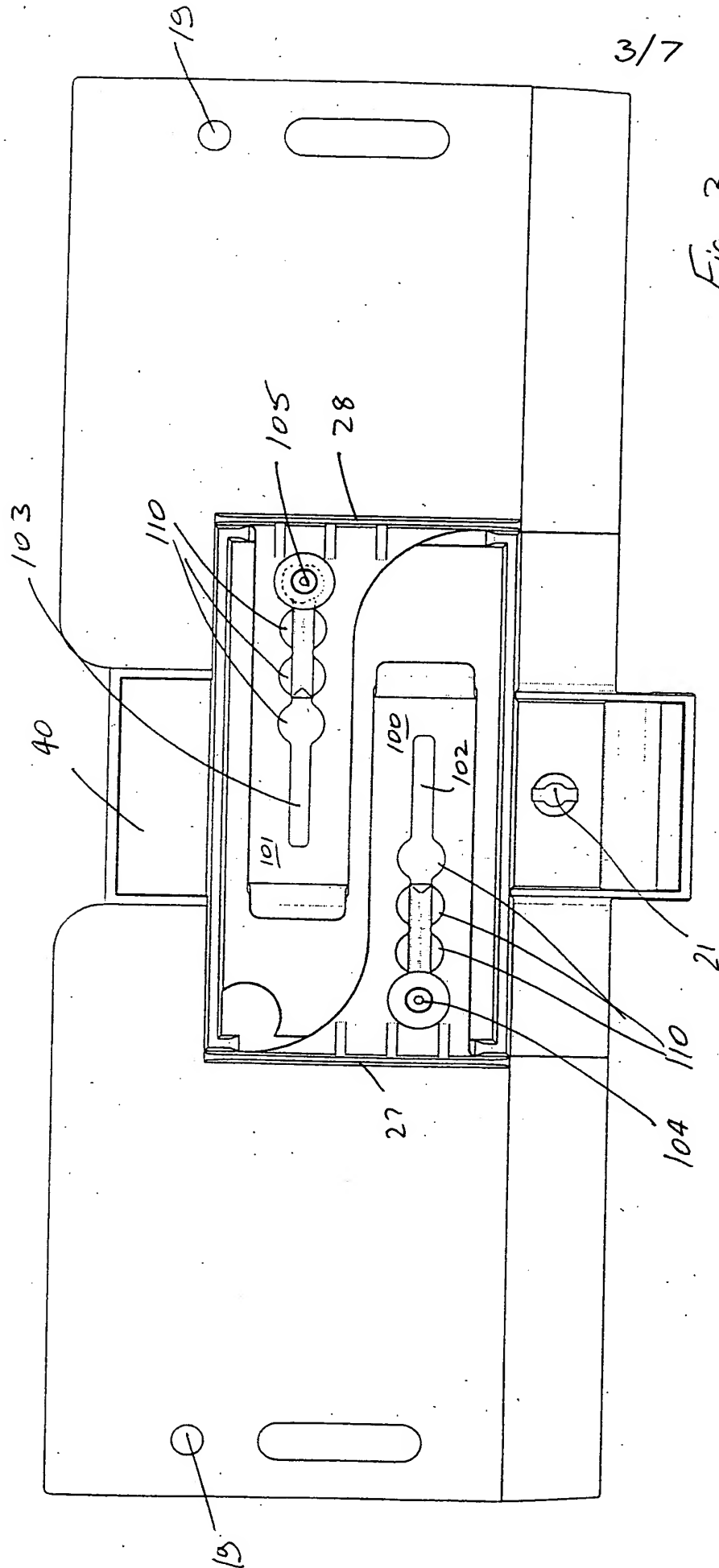


Fig. 3

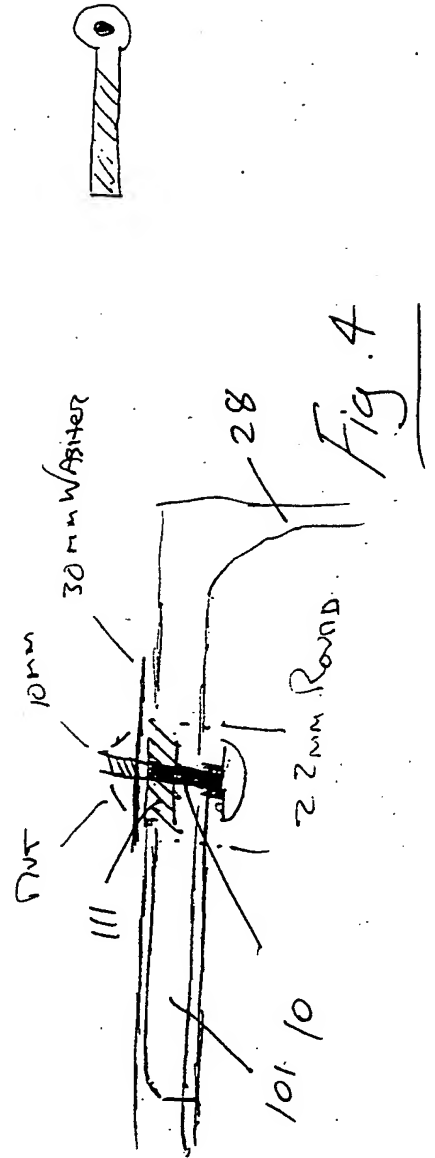


Fig. 4

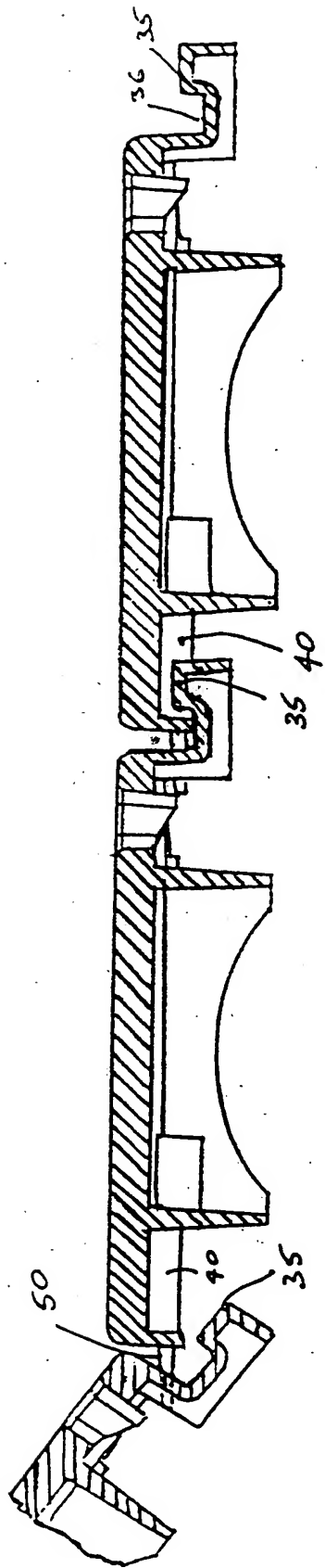


Fig. 5

5/7

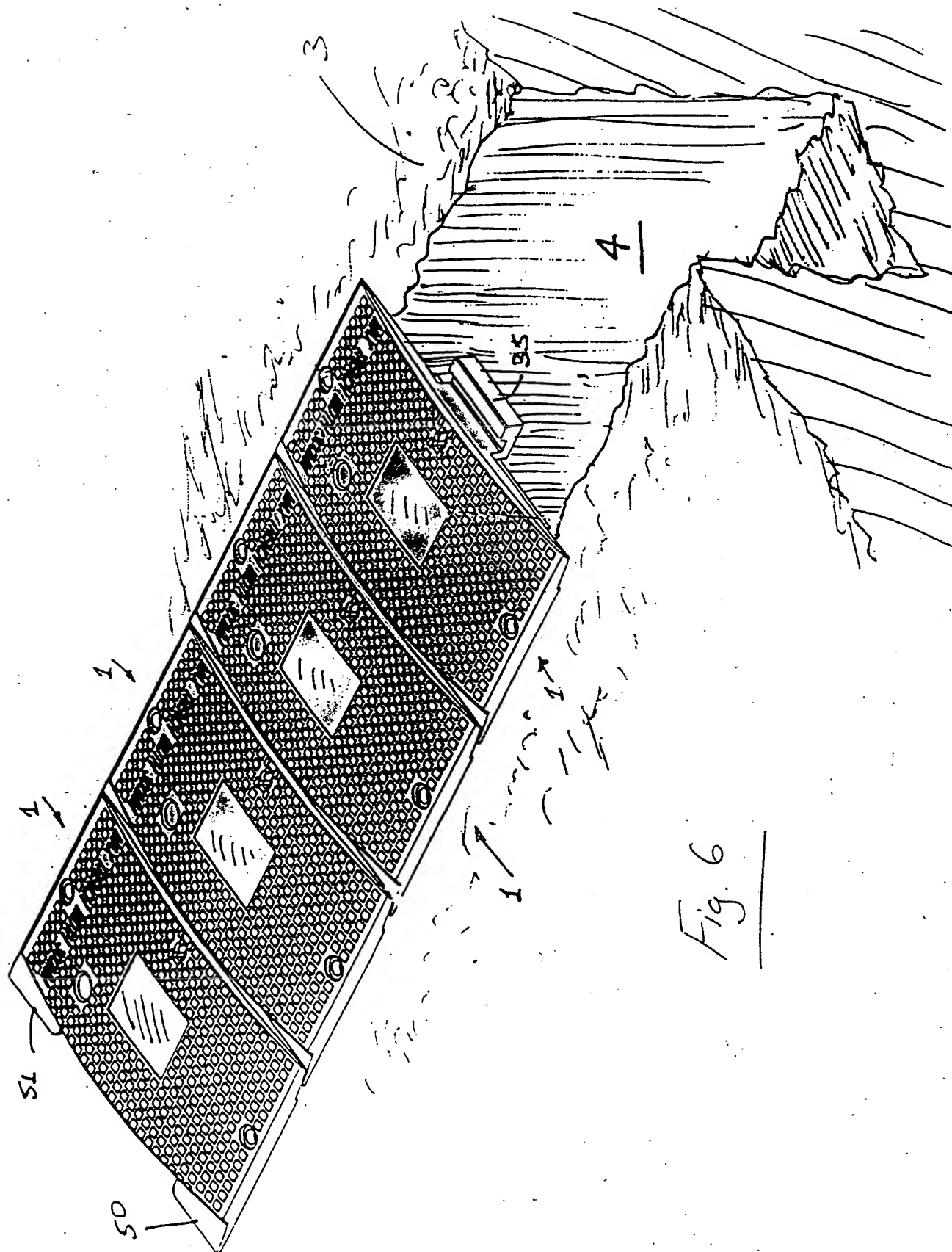


Fig. 6

6/7

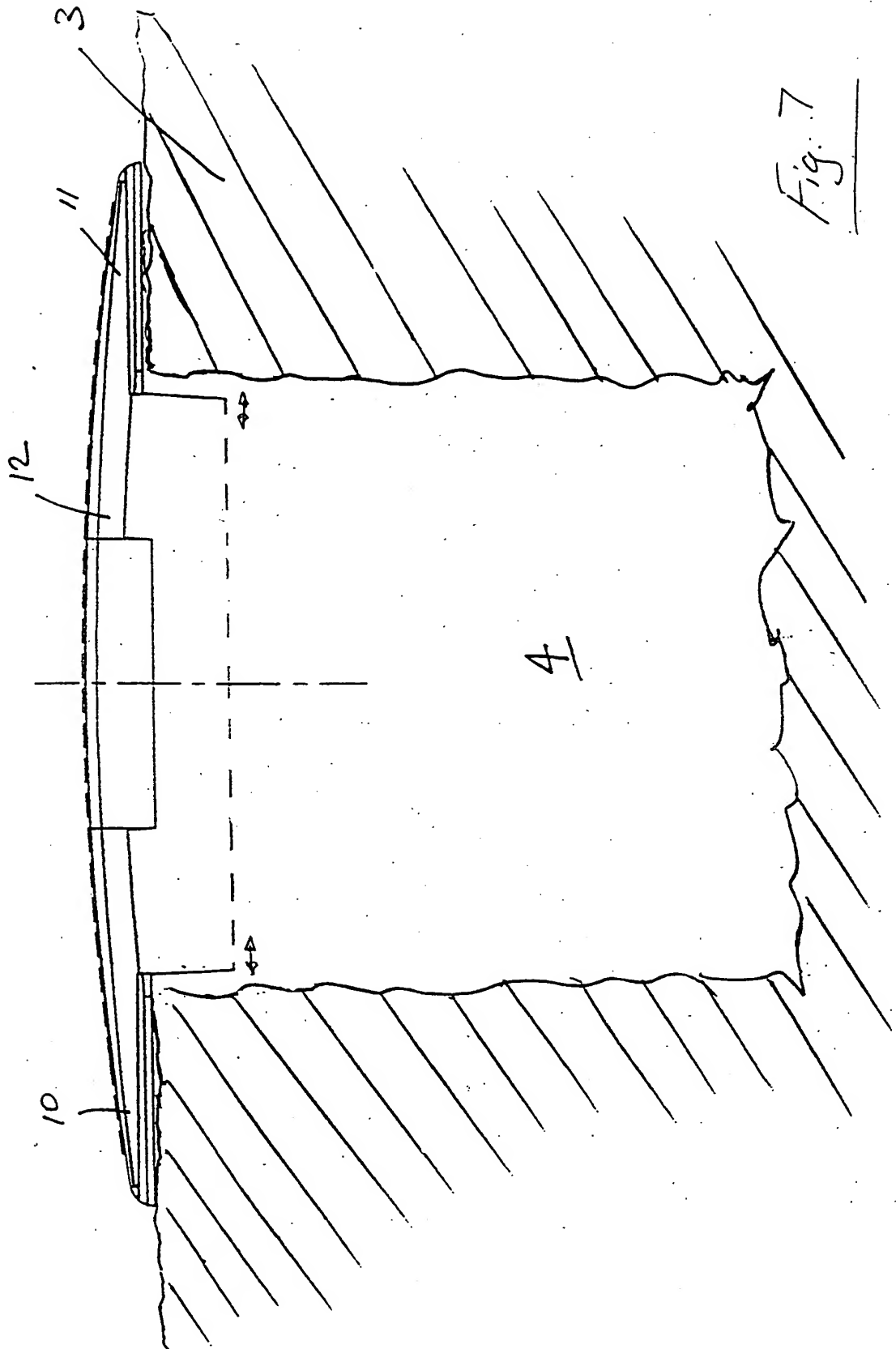


Fig. 7

